

Claims

1. Insulation material element of mineral fibers, bound with a binding agent, soluble in a physiological milieu, in form of an insulation material plate or to a insulation material sheet rolled up as a roll and separable into insulation material plates as a portion of a system, prepared for clamped assembly of insulation plates between beams, such as roof rafters, **characterized in that** the composition of the mineral fibers of the insulation material element features a alkali/earth alkali relation of < 1 and that their fiber structure is determined by an average geometric fiber diameter of $\leq 4 \mu\text{m}$, by a gross density in the range of 8 to 25 kg/m³ and a portion of the binding agent referred to the fiber mass of the insulation material element in the range of 4% to 5,5 weight %.

2. Insulation material element according to claim 1, **characterized in that** said binding agent is an organic binding agent.

3. Insulation material element according to claim 1 or 2, **characterized in that** the binding agent, referred to the fiber mass of the insulation material sheet, is in the range of 4,5 to 5 weight %.

4. Insulation material element according to one of the preceding claims, **characterized in that** its gross density is in the range of 8 to 14 kg/m³, preferably 11 to 14 kg/m³, especially approximately 13 kg/m³, and the insulation material element features a thermal conducting capacity corresponding to thermal conductivity group 040, according to DIN 18165 or similar.

5. Insulation material element according to one of the preceding claims, **characterized in that** their gross density is in the range of 18 to 25 kg/m³, preferably 19 to 24 kg/m³, especially 23 kg/m³, and the insulation material element features a thermal conducting capacity corresponding to the thermal conductivity group 035, according to DIN 18165.

6. Insulation material element assembled between beams, such as roof rafters, without additional internal lining, according to one of the preceding claims, **characterized in that** it features a fire resistance category of at least EI 30, according to EN 113501.

7. Insulation material element according to one of the preceding claims, **characterized in that** the roll up process of the mineral fiber felt, rolled up in form of a roll, is accomplished free of a prior treatment, eventually free of a fulling process.

8. Insulation material element according to claim 7, **characterized in that** the wound up roll of the mineral fiber felt is compressed pursuant to a compression ratio of 1:3 until 1:8, preferably 1:4 until 1:6.

9. Insulation material element according to one of the preceding claims, **characterized in that** upon said section, markings are provided as cutting aids, featured at least on one roll surface.

10. Insulation material element according to one of the preceding claims, **characterized in that** the mineral fibers of the insulation material element, as far as their solubility in a physiological milieu is concerned, correspond to the requirement of European Guideline 97/69/EG and/or the requirements of the German Dangerous Products Norm, Section IV, Nr.22.

11. Insulation material element according to one of the preceding claims, **characterized in that** said mineral fibers of the insulation element are produced by internal centrifugation in the centrifuging basket process, with a temperature at the centrifuging basket of at least 1.100 ° C.

12. Insulation material element according to one of the preceding claims, **characterized in that** it features a fusion point according to DIN 4102, Part 17, of ≥ 1.000 ° C.

13. Insulation material element according to one of the preceding claims, **characterized by** the following ranges of chemical composition of mineral fibers in weight %:

SiO ₂	39 – 55 %	preferably	39– 52 %
Al ₂ O ₃	16 – 27 %	preferably	16 - 26 %
CaO	6 – 20 %	preferably	8 - 18 %
MgO	1 - 5 %	preferably	1 – 4,9 %
Na ₂ O	0 - 15 %	preferably	2 - 12 %
K ₂ O	0 - 15 %	preferably	2 - 12 %
R ₂ O (Na ₂ O + K ₂ O)	10 – 14,7 %	preferably	10 – 13,5 %
P ₂ O ₅	0 - 3 %	especially	0 - 2 %
Fe ₂ O ₃ (Iron total)	1,5 - 15 %	especially	3,2 - 8 %
B ₂ O ₃	0 - 2 %	preferably	0 - 1 %
TiO ₂	0 - 2 %	preferably	0,4 - 1 %
Other	0 – 2,0 %		

14. . Insulation material element according to one of the preceding claims, **characterized in that** the fiber structure of the insulation material element is respectively free of beads, meaning the bead portion is $< 1\%$.

5 15. System for clamping insulation material elements between rafters of a building, in particular rafters of a roof, characterized by insulation material elements with the features of one or several of the preceding claims, being aligned and clamped with a clamping felt between adjacent beams.